Net Blotch, Spot Blotch and Scald of Barley

FarmFacts

Produced by Saskatchewan Agriculture and Food and Saskatchewan Rural Development

Net blotch, spot blotch and scald are fungal leaf diseases of barley. These diseases tend to be more of a problem in northern or eastern Saskatchewan where moisture levels are higher, but they can be found almost anywhere barley is grown. Yield losses are highest when the flag leaf becomes infected.

NET BLOTCH

Net blotch is caused by the fungus *Pyrenophora teres*. This disease attacks leaves, sheaths and glumes and may lower malting quality of grain. Typical yield losses are in the range of 10 to 40%.

Symptoms:

Net blotch can be quite variable in appearance depending on the strain of the fungus, the variety of barley, and the growth stage of the crop. In general, there are two types of net blotch, the "net-form" and the "spot-form". The net-form of net blotch appears on leaves as small, brown spots which enlarge into longitudinal streaks up to several centimeters in length. Darker longitudinal and horizontal lines develop in the lesions, creating a net like appearance. The spot-form of net blotch causes oval, solid brown spots, which closely resemble the disease spot blotch. With both spot and net type of symptoms, leaf tissue surrounding the spots may turn yellow. When severe, entire leaves may be killed.

Net blotch (3 left-most leaves) and spot blotch (right leaf)

Disease Cycle:

The fungus overwinters on barley straw and stubble and on infected seed. Spores produced on stubble or straw are spread by wind to initiate infections in the spring. Seedling infection may also occur directly from infected seed, especially when temperatures are cool. The disease continues to spread in a crop as additional spores are produced on leaf spots and dying leaves. Net blotch development is favoured by high humidity and rainfall, and temperatures of 15 to 25°C. In general, the seedling stage is more susceptible than the adult plant. Both the net and spot-forms of net blotch are widespread in Saskatchewan, however the spot-form is now predominant and is spreading in south and central areas where net blotch has not previously been a problem.

Control:

1. A rotation away from barley for 2 years will allow infected straw and stubble to decompose. Barley should not follow barley in heavily infected fields. It is especially dangerous to plant susceptible varieties on barley stubble.
2. Turning under straw and stubble reduces the rate of infection in the following year's crop.
3. Seed treatment with carbathiin (Vitavax) reduces the chance of introducing new races of the fungus to barley fields, and may reduce the incidence of seedling blight. Seed treatment will not protect post seedling plants from infection. Carbathiin will also provide control of loose and covered smut.
4. Grow resistant varieties. Net blotch resistance is complex, as varieties may be resistant to some strains of the fungus but not others. For example, Heartland has resistance to both spot and net forms of net blotch, while Ellice is resistant only to the net form. To further complicate matters, the resistance of a variety may vary depending on the growth stage. Many varieties have enhanced resistance as adult plants. General resistance reactions are listed below:

Very good:	Heartland
Good:	Argyle, Bonanza, Brier, Virden, and Winchester.
Fair:	Ellice, Deuce, Duke, Johnston, Leduc, Noble, Samson and Tupper.
Poor:	Harrington, Klages, Abee and Scout.

As a group, six-rowed barley cultivars generally show less damage than two-rowed types.

5. Foliar fungicide application may be an option for intensive management situations. Check current provincial recommendations.

SPOT BLOTCH

Spot blotch is caused by the fungus *Cochliobolus sativus*. It affects both barley and wheat, but is more severe on barley. Many wild grasses are also hosts. Yield losses may reach 10 to 20%, and malting quality may be reduced. Spot blotch is most commonly found in southeastern Saskatchewan.

Symptoms:

Symptoms appear on leaves as small, brown spots which enlarge into oval, dark brown spots 0.5 to 1 cm long. Spots may be surrounded by a zone of yellow. The lesions may also occur on leaf sheaths and heads. The fungus also causes seed discolouration (black point or smudge) and common root rot. When infected seed is planted, poor emergence and seedling blight may result.

Disease Cycle:

The life cycle of the fungus is similar to that of net blotch. Overwintering occurs on infected crop debris or seed, but it can also survive in the soil as spores for several years. Seed or soil-borne inoculum can cause seed rot or seedling blight. Seed infection tends to occur when warm humid weather persists following heading.

Control:

1. Seed treatment reduces seedling blight and helps to improve emergence, but will not protect post-seedling plants from infection.
2. Crop rotation out of barley for 2 years will reduce infection. It is preferable to grow non-cereal crops during the rotation, but even wheat may provide some benefit.
3. No resistant varieties have been identified.

SCALD

Scald is caused by the fungus *Rhynchosporium secalis*. Yield losses of up to 10% are common, but can be higher. The disease may reduce kernel weight and plumpness.

Symptoms:

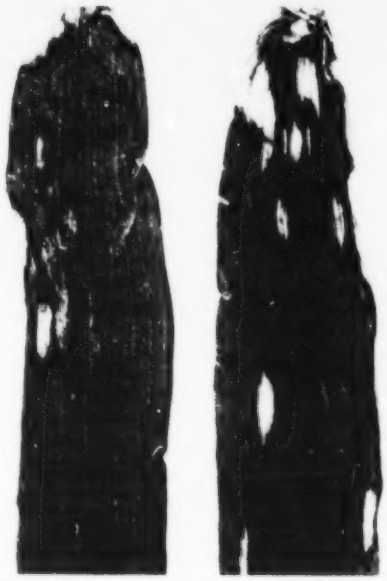
The fungus attacks leaves, sheaths and sometimes glumes and awns. Symptoms first appear as oval, greyish green spots, 1 to 1.5 cm long. The central tissue dries out and becomes bleached and straw coloured, while outer margins of the spot remain a distinct dark brown. Entire leaves may be destroyed.

Disease Cycle:

The scald fungus overwinters on barley straw and stubble, producing spores in the spring which infect barley plants. Spore production continues on dying leaves under wet conditions. Scald is favoured by cool, humid weather (12-20°C), and spreads by splashing rain. The fungus can also be seed-borne, and seedling infection from infected seed is possible. The importance of seed-borne inoculum is not known, but is probably much less important than the large number of spores produced on crop residues.

Control:

1. Turning under crop debris or a one to two year rotation away from barley will reduce the available inoculum in a field. Bromegrass should not be used in the rotation, as it is also susceptible to scald.
2. Resistant varieties include Brier, Duke, Leduc and Winchester. The variety Johnston has an intermediate level of resistance.
3. Foliar fungicide application may be an option for intensive management situations. Check current provincial recommendations.



Scald lesions on barley

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